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By-Kurtz, Albert K.; And Others

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A total of 3039 tenth-grade students in seven Pennsylvania high schools participated in an experiment, part of a study to attempt an assessment of the relative contribution to learning from the following: 1. Films of participation (by immediate audience response to inserted questions on salient facts). 2. Films of reinforcement (by immediate repetition in titles of salient points of fact); and 3. Films shown twice. Of the 3039 subjects, an analysis was made of the test scores of 1332, comprising 111 boys and 111 girls from each of six of the seven schools. Results were largely inconclusive. It seems clear, though, that both inserted questions and statements, and repetition of the film without inserted material were effective in facilitating learning. Showing the film twice--a relatively simple and inexpensive procedure--seems to be as effective as the more elaborate methods. (CO)

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TECHNICAL REPORT - SDC 269-7-16

THE EFFECTS OF INSERTED QUESTIONS AND STATEMENTS ON FILM LEARNING

(Rapid Mass Learning)

The Pennsylvania State College
Instructional Film Research Program
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Investigators:

Albert K. Kurtz, Research Analyst and Professor of Psychology
Jeanette S. Walter, Research Scholar
Henry Brenner, Research Scholar

FOR THE PENNSYLVANIA STATE COLLEGE:

Dean M. R. Trabue
Responsible Administrator

C. R. Carpenter
Program Director

FOR THE SPECIAL DEVICES CENTER:

Reviewed for Human Engineering Branch:

J. Caberman
Project Engineer

C. P. Seitz, Ph.D.
Head, Code 912

Submitted:

C. S. Rhoads
Technical Director

Approved:

J. R. Ruhsenberger, Captain, USN
Commanding Officer and Director

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SUMMARY

In this experiment,, six methods of teaching a body of factual material by films were compared. Two different films were used: - one dealt with a technical subject - "The Care and Use of Hand Tools - 'Wrenches"; the other was of the general information type dealing with "Snakes".

The Film Versions

Six versions of each film were prepared as follows:

I The original film, used as a control version.

II A repetition version, consisting of two prints of the original film, spliced together, and shown in continuous succession.

III A "persistent questions" version that had multiple-choice questions inserted at frequently as possible - every 32 seconds on the average.

IV A "persistent statements" version which contained reinforcing statements at frequent intervals - on the average 32 seconds.

V A "medium questions" version which contained only every alternate question used in the persistent questions version.

VI A "medium statements" version which contained only every alternate statement used in the persistent statements version.

The inserted multiple-choice questions were designed to be very simple, always covering information that had just been presented. They were intended to facilitate learning, not to measure the learning which took place. The students were required to answer each question as it appeared on the screen. After a short interval, the correct answer was given and the film continued to the next point. The statements were intended to reinforce the information which immediately preceded them and were inserted at the same places in the films as were the questions in the "questions" version. They covered the same material.

The Experimental Population

A total population of 3039 tenth-grade students in seven Pennsylvania high schools participated in the experiment. Of this number, an analysis was made of the test scores of 1332 subjects, comprising 111 boys and 111 girls from each of six of the seven schools.

The experimental sample was selected by matching individuals across the six schools for sex, age, and mental ability (as measured by the Otis Quick-Scoring Mental Ability Test). Since the samples in all the schools were practically identical with respect to age, sex, and intelligence test scores, the sample in each school was used as an intact group for one version of each of the two films. However, in no school was the same version of both films shown.

The Procedure

The students were first given a list of the unfamiliar words which would be mentioned in the films. In the case of the inserted questions versions, they were given verbal instructions about answering the questions in the film on a special answer sheet. The film version was shown and immediately afterwards a multiple-choice item test was administered. The test on the "Wrenches" film contained 71 items; the test on the "Snakes" film included 74. The tests were readministered after a period of four weeks as a means of measuring retention of learning.

Results

The data were analyzed to provide mean scores as follows: (1) for each version of both films, (2) for boys and girls separately, (3) for all items in the tests, (4) for those items which were emphasized by persistent questions or statements, (5) for those items emphasized by the medium level of questions and statements, (6) for those items not emphasized in the "persistent" versions and (7) for those items not emphasized in the "medium" versions.

The repetition version and the inserted questions and statements versions were generally superior to the original film shown once. Showing the film twice (repetition version) was about as effective for teaching specific important points as emphasizing these points directly by the insertion of participation questions or reinforcing statements. However, the rank order of the six methods was generally inconsistent as between both sexes and both films. The results suggest that inter-school variability may have been almost as great as the inter-method variability despite the matching techniques used.

Conclusions

The absence of a generally consistent order of effectiveness of the various treatments limits the conclusions that may be drawn. It seems clear that both inserted questions and statements and repetition of the film without inserted material were effective in facilitating learning. Furthermore, showing the film twice--a relatively simple and inexpensive procedure--seems to be about as effective as the more elaborate methods used.

THE EFFECTS OF INSERTED QUESTIONS AND STATEMENTS ON FILM LEARNING

by

Albert K. Kurtz, Jeanette S. Walter, and Henry R. Brenner

INTRODUCTION

This study represents an attempt to assess the relative contribution to learning from films of participation (by immediate audience response to inserted questions on salient facts), of reinforcement (by immediate repetition in titles of salient points of fact), and of showing a film twice.

Previous investigations have shown that participation by means of response to questions, and reinforcement by restatement of main points or by repeated showings, each may contribute to more effective learning. Hall[1], using silent films with first year high school students, employed a slide projector to project questions on a separate, but adjacent, screen before and during the showing of films. He found that learning was facilitated. Hovland, Lumsdaine, and Sheffield[2] studied the effect of participation in learning the phonetic alphabet from sound filmstrips. In the "standard" version of the filmstrip, the commentator stated both the letter and the phonetic symbol as a review exercise after each symbol presentation. In the "participation" version, review by the commentator was omitted and, instead, the trainees were required to call out the symbol upon being shown the letter. The "participation" version was substantially superior to the "standard" version in percentage of phonetic symbols recalled. Gibson[3] reported that learning to identify aircraft from slide films was facilitated by requiring vocal attempts in recalling identification on a second exposure of the slide, followed almost immediately by repeating the correct identification.

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1 Hall, W. J. A study of three methods of teaching science with classroom films. School Science and Mathematics, 1936, 36, 968-973.

2 Hovland, C. I., Lumsdaine, A. A., and Sheffield, F. D. Studies in Social Psychology in World War II: III. Experiments on Mass Communication. Princeton: Princeton University Press, 1949.

3 Gibson, J. J. (Editor). Motion Picture Testing and Research. Report No. 7, Army Air Forces Aviation Psychology Program Research Reports. Washington, D. C.: Government Printing Office, 1947.

An experiment rather similar to the one about to be reported was carried out by the Motion Picture Research Project of Yale University[4]. This investigation studied the value of introducing into a film, questions designed to increase the pupils' motivation to learn and to increase their active participation as they viewed the film.

Pictorial material from two already existing films, on the subject of the heart and the circulation of the blood, was organized into a series of seven units. The motivating questions were presented in titles just before each unit of factual material. The questions were designed to interest the pupils in learning the material about to be presented, and to direct attention to the relevant aspects of what was to be shown.

The participating questions were designed to get the pupils to respond actively by answering, at the end of each unit, a question concerning the material that had just been presented. The questions were printed on a work sheet which the pupils used during the film showing. As each unit was completed, a film title directed the pupils to answer the question covering that unit. After a short interval, the correct answer was then given on the screen.

Five groups were used, matched on the basis of school grade, initial test score and sex. Each group saw a different version of the film. The five versions included: (I) A straight factual presentation with neither motivating nor participation questions; (II) The factual presentation supplemented by participation questions; (III) The factual presentation supplemented by motivating questions; (IV) The factual presentation supplemented by both motivating and participation questions; (V) The factual presentation shown two times with neither motivating nor participation questions.

The informational gains, reported in percentages of increase over pretest correct answers, were as follows for the five versions: (I) factual presentation only 8.2%; (II) participation questions version 12.2%; (III) motivating questions version 10.5%; (IV) motivating plus participation questions version 14%; (V) factual presentation shown twice without questions 12%.

Thus, the film shown twice was about as effective as the film with inserted participation questions, and slightly, but not reliably, better than the film with motivating questions.

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4 Motion Picture Research Project, Yale University, "Do 'Motivation' and 'Participation' Questions Increase Learning?" Educational Screen, Vol. 26, No. 5 (May, 1947), pp. 256-259, 274 and 283.

This study raised an important question concerning what material was affected by the participation questions. It is conceivable that the insertion of questions may reinforce learning of the facts dealt with in these questions, but interfere with learning of other facts in the film. Scores on items relating to points emphasized by participation questions were analyzed separately from scores on items relating to non-emphasized points. A comparison between the straight factual version and the participation questions version showed that superiority on total score for the group seeing the latter version was almost entirely attributable to superior performance on test items relating to the specific points emphasized by participation questions.

STATEMENT OF THE PROBLEM

In the present study the following questions were posed for experimental investigation:

1. What is the effectiveness of a particular type of overt action on film learning? The method used was that of inserting a certain number of multiple-choice questions in an educational film. Each question was read by the commentator as it appeared on the screen. The student marked his answer on the answer sheet. The correct answer was then shown on the screen, repeated by the commentator, then the film subject matter continued until the next question appeared.

2. What is the effectiveness of including some other type of relevant material not calling for the use of overt activity? The method used was that of inserting a certain number of statements in the film, so that the students would see and hear statements covering the factual information which had just previously been presented in the film. These statements were read by the commentator as they appeared on the screen, and were positive reiterations of the points which were reinforced in the other film versions by the inserted questions.

3. Which of two levels of rates of occurence of inserted questions or statements would produce more learning? The higher level consisted of twice as many questions or statements as the lower level.

4. A fourth question was to determine whether or not a difference in film subject matter would influence the relative effectiveness of inserted questions or statements. The method used was that of varying the type of subject matter by using two types of films, one of which was technical, the other of which was of the general information type.

5. Does the effectiveness of inserted questions or statements vary with the sex of the film audience? The method used was that of analyzing the test results of the boys and girls separately.

6. What is the effect of inserted questions or statements on the retention of the film subject matter? The method used was that of administering a retention test four weeks after the showing of the film.

7. Is showing a film twice a good method of increasing learning? The method used was to show the original unaltered film two times in immediate succession. This permitted comparisons with the original film shown once and with the special versions containing inserted questions or statements. This arrangement also made it possible to equate for the time required by the special experimental versions.

The experimental film versions will be described in the next section of the report.

EXPERIMENTAL DESIGN AND PROCEDURES

The Films

Two films differing in subject matter were selected for use in the experiment. They were (1) "The Care and Use of Hand Tools--Wrenches"[5] and (2) "Snakes"[6]. For each film, six experimental versions were prepared, as follows:

C1 - the base film, used as a control version.

C2 - a repetition version, two prints of the base film spliced together and projected in continuous succession.

PQ - a "persistent questions" version that had multiple-choice questions inserted at a "persistent" level - every 32 seconds, on the average.

PS - a "persistent statements" version that had reinforcing statements inserted about every 32 seconds.

MQ - a "medium questions" version that had inserted only every alternate question included in the "persistent questions" version, or a question every 64 seconds, on the average.

MS - a "medium statements" version that had inserted every alternate statement included in the "persistent statements" version, or a statement about 64 seconds.

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[5] Produced by U. S. Signal Corps. Black and while, sound film. The original film was edited and shortened to 13 minutes, and a new commentary added.

[6] Produced by Coronet. Color, sound, running time-10 minutes.

The inserted multiple-choice questions were designed to be very simple. They always covered information that had just been presented. They were intended to facilitate learning; they were not used to measure the learning that took place at the time.

In the "persistent questions" version, as many questions were inserted as possible, within the limitation that the intervals between questions be kept approximately equal. To achieve a smooth production, questions were inserted at places where there was either a fade-out or a change of scene, either of which was accompanied by a pause in the commentary. In the "persistent" version of "Wrenches", there were 25 questions; in the "persistent" version of "Snakes" there were 20.

Since the "medium questions" versions were prepared by deleting every even-numbered question from the "persistent questions" versions, there were 13 questions in the "medium questions" version of "Wrenches" and 10 questions in the "medium questions" version of "Snakes".

The inserted statements in the "statements" versions were inserted at the same places and covered the same points which were the subject of questions in the "questions" versions. For example, in the "questions" versions of the "Snakes" film the following question occurs:

Special organs in the mouths of snakes combine the senses of:

(1) hearing and smell
(2) sight and hearing
(3) taste and hearing
(4) taste and smell

The corresponding statement was: Special organs in the mouths of snakes combine the senses of taste and smell.

The Tests

Matching test. To select comparable groups of students, the Otis Quick-Scoring Mental Ability Tests, Gamma Form B, was employed.

Film tests. A multiple-choice test was constructed for each of the two films. The test on "Wrenches" included 71 items; the test on "Snakes" included 74 items.[7]

The following scores were obtained for each film test: total score, score on unemphasized items, score on items emphasized in both medium and persistent versions, score on items emphasized in the persistent version only.

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[7] The coefficients of reliability (based on Kuder-Richardson Formula 14), were: Wrenches .92' Snakes .90.

Experimental Population

A total population of 3039 tenth-grade students in seven Pennsylvania high schools participated in the experiment. Of this number, an analysis was made of the film test scores of a sample 1332 subjects, comprising 111 boys and 111 girls from each of six of the seven high schools.

The experimental sample was selected by matching individuals across the six schools, for boys and girls separately, on the Otis Quick-Scoring Mental Ability Test, and on age. This matching was done after the films had been shown and the film tests administered to the 3039 students, so that it was possible to exclude any individual who had failed to be present at all the film and test sessions.

As a result of the matching, 76 girls were matched from each of the six sxhools by identical intelligence test scores, and 35 from each school were matched within a 3-point intelligence test score range. Similarly, 62 sets of boys were matched exactly, and 42 sets were each matched within a 3-point intelligence test score range.

The mean intelligence test score for each set of boys was 38.3, with a standard deviation of 8.7; the mean intelligence test score for girls was 35.5 with a standard deviation of 8.4.

Experimental Procedures

Since the sample in any one school was practically identical, with respect to intelligence test score and age, to the sample in any other school, the sample in each school was used as an intact group for one version of each of the two films. However, in no school was the same version of both films shown. Table 1 summarizes the distribution of versions by schools.

TABLE 1

DISTRIBUTION OF FILM VERSIONS BY SCHOOLS

School	"Wrenches" Film	"Snakes" Film
A	Persistent Questions (PQ)	Persistent Statements (PS)
B	Persistent Statements (PS)	Medium Questions (MQ)
C	Base Film Once Only (C1)	Base Film Twice (C2)
D	Medium Questions (MQ)	Base Film Once Only (C1)
E	Base Film Twice (C2)	Medium Statements (MS)
F	Medium Statements (MS)	Persistent Questions (PQ)

The experiment in each school was conducted in the school auditorium. Teachers served as proctors, with approximately one teacher for every 30 students. The films were projected and the tests administered by a team from the Instructional Film Research Program.

After the students were seated, a short standard motivating introduction was given them. Then a list containing the more difficult words in the "Wrenches" film was read aloud. This list, which was also mimeographed on the back of the IBM test answer sheets, was used to enable students to recognize in written form, unfamiliar words that they would hear in the commentary in spoken form.

After the word list had been read, the "Wrenches" film was projected. In order that students who were to be shown the questions versions could see to write during the film showing, the auditoriums were dimly illuminated for all versions, to obviate a differential effect attributable to this illumination.

For the questions versions, the projected questions were answered on special answer sheets during the showing of the film. Each student wrote the number of the answer which he thought was correct in the column of the special answer sheet headed "Your Answer". The students were allowed eight seconds to answer the question. The incorrect alternatives on the screen "faded away", leaving only the original question, the number of the correct answer, and the correct answer. At that time, the commentator repeated the number of the correct answer and repeated the question and the correct answer in a statement form. The film commentator than instructed the students to write the number of the correct answer in the column headed "Correct Answer" on the special answer sheet.

These special answer sheets were not collected or graded. The subjects were informed that these papers were for them to keep. They were also told how they could compute their percentage grades, so they could see how well they did on the questions.

It was quite possible for the subjects to wait until the correct answer had appeared on the screen before writing the number. However, from close obervation of the students while they were viewing the film, it appeared that they were following the directions implicitly and playing the game. One reason for this may have been the fact that the questions were very easy.

The "statement" versions required no such participation on the part of the students.

Immediately following the showing of the "Wrenches" film, the film test booklets and IBM answer sheets were distributed.

The students were given thirty minutes working time on each test. Four time warnings, one every seven minutes, were given during the administration of the tests. Both the test on the General Information Film (Snakes) and the test on the Technical Film (Wrenches) were designed to be power tests and not speed tests. For most students, thirty minutes was ample time to complete the tests.

After the test materials on the "Wrenches" film were collected, the entire procedure was repeated for the "Snakes" film: the vocabulary list was read, the film was projected (with interpolated responses to questions if it was a questions version), and the film test was administered.

Four weeks after the film showings, the students were again given the two film tests to obtain a measure of retention of learning.

RESULTS

In this experiment six experimental film versions were used for teaching a body of factual material. Since two separate contents (films) were used, and since an analysis was made of the performance of boys and girls separately, a wide variety of results were possible.

The order of the six methods (as their effectiveness was measured by the mean scores on the two film tests) was generally inconsistent as between both the sexes and the two films. Only two relatively consistent relationships (consistent for both films and both sexes) were noted.

First, the repetition version (showing the film twice) was better than the persistent question version, medium question version, and the medium statement version. However, the anomalous result that the boys seeing the "Snakes" film <u>once</u> scored higher than any other group of boys seeing the "Snakes" film, should be noted.

Second, the persistent statements version was consistently better than the medium statements version (although the persistent statements version was not always better than the repetition version).

A constant sex difference was also noted: for every version for both films, the scores of the girls were lower than the scores of the boys. It should be noted that the mean intelligence score for the boys was higher than that for the girls, but this difference was not great enough to account for the difference in performance on the film tests. The results of the retention tests closely paralleled those for the immediate recall test, except that some forgetting occurred.

Total test score results. Table 2 summarizes the mean scores on the total test (all items without distinction as to whether they were emphasized by the questions or statements, or not emphasized at all). The means are presected both by schools and by film versions, to emphasize the point that in any one school only one version of each film was shown. Although the students were matched person for person across schools on the basis of the Otis intelligence test score, and age, and sex, examination of the data suggests that variability among schools may have been almost as great as variability among methods. Therefore, it is difficult to attribute the differences primarily to either inter-school or to inter-method variability.

These discrepancies are evident in Table 2. For example, the means for school A ranked near the top for both films for both sexes: the means for the persistent questions version for the "Wrenches" film were among the high means for that film. On the other hand, the means for school F are the lowest of all: the means for the persistent questions version of the "Snakes" film, which was shown in School F, were the lowest means for this film. Of the alternate hypotheses, (a) that persistent questions facilitiate learning about wrenches, but interfere with learning about snakes, and (b) that the school populations differed, the latter seems the more likely.

It was thought that matching students across schools for age, sex and mental ability, and arranging for comparable film viewing conditions, would adequately control inter-school differences. This was apparently not the case. It seems possible, as an ex post facto observation, that differences between schools in morale and motivation, previous experience in the subjects taught by the films, or in socio-economic status, could have been large enough to cause the inter-school variability, which seems evident in the results.

In view of these considerations, tables showing the inter-methods differences and the probability that each difference exceeded chance at a given level of confidence will not be included in this report.[8] In general, a difference 1.5 to 2 score points was significant at at least the five per cent level of confidence, for the 74-item test on the "Snakes" film. A difference of about 3 score points was generally significant at at least the five per cent level for the 71-item test on the "Wrenches" film.

The most consistent results are those for the C2 (repetition version). They suggest that showing the film twice, is about as good as using inserted questions or statements.

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8 These data are presented in Walter, Jeanette Sprecher, and Brenner, Henry Richard, The Effects of inserted questions and statements on film learning. 1949, M.S. thesis, Pennsylvania State College, Tables 2 through 26.

TABLE 2

MEAN SCORES ON TOTAL FILM TEST, FOR BOTH FILMS, FOR SEXES AND SCHOOLS (IMMEDIATE RECALL TEST)

By Versions

	"Wrenches" Film			"Snakes" Film		
Version	Boys	Girls	Both	Boys	Girls	Both
P Q	47.9(5)	31.8(4)	39.8(5)	48.2(1)	41.8(1)	45.0(1)
MQ	46.7(4)	31.2(3)	39.0(3)	49.1(2)	44.5(4)	46.8(3)
PS	44.6(3)	33.9(5)	39.3(4)	51.6(5)	45.8(6)	48.7(6)
MS	44.0(2)	28.0(1)	36.0(2)	49.8(3)	42.4(2)	46.1(2)
C1	41.8(1)	29.2(2)	35.5(1)	52.6(6)	42.8(3)	47.7(4)
C2	48.4(6)	34.9(6)	41.7(6)	50.7(4)	45.4(5)	48.1(5)

By Schools

	"Wrenches" Film				"Snakes" Film		
Schools	Version	Boys	Girls	Both	Version	Boys	Girls	Both
A	PQ	47.9(5)	31.8(4)	39.8(5)	PS	51.6(5)	45.8(6)	48.7(6)
B	PS	44.6(3)	33.9(5)	39.3(4)	MQ	49.1(2)	44.5(4)	46.8(3)
C	C1	41.8(1)	29.2(2)	35.5(1)	C2	50.7(4)	45.4(5)	48.1(5)
D	MQ	46.7(4)	31.2(3)	39.0(3)	C1	52.6(6)	42.8(3)	47.7(4)
E	C2	48.4(6)	34.9(6)	41.7(6)	MS	49.8(3)	42.4(3)	46.1(2)
F	MS	44.0(2)	28.0(1)	36.0(2)	PQ	48.2(1)	41.8(1)	45.0(1)

Note: The number in parenthesis is the rank order of the mean in that column. Rank 1 is the lowest mean; 6 is the highest mean.

Part test score results. It was possible to score separately (1) those items emphasized in the "persistent" versions, (2) those items emphasized in the "medium" versions, (these were also in the "persistent" versions), (3) those items not emphasized in the "persistent" versions, and (4) those items not emphasized in the "medium" versions. Since the total test scores (which obscure the effects of these items) failed to reflect very consistent inter-methods differences, these part scores were analyzed. The part scores relating to the emphasized and unemphasized items are reported in Table 3. Both the "persistent" level versions and the "medium" level versions are compared with the control version C1, and the repetition version C2.

For the emphasized items themselves, either repetition (in the course of repeating the entire film as in version C2) or emphasis with statements or questions, generally resulted in more recall than the C1 version, (the base film shown once). In fifteen out of the eighteen possible comparisons, the experimental versions were better than the C1 control version. The performance of the boys' on the test for the "Snakes" film was an exception, however. In this case the base film group scores were as high or higher than the repetition version group, the medium questions version group, and the persistent questions version group. This finding merely parallels the results for the boys on the total test for this film. The other comparisons do not yield consistent differences, for the emphasized items, as between the repetition version and the four emphasis versions. Thus, for boys the mean on the emphasis items for the persistent questions version of the "Wrenches" film is higher than the mean for the persistent statements version, but the reverse is true for girls. For both boys and girls, the means for the medium questions version of the "Wrenches" film are higher than the means for the medium statements version, while the means for the repetition version are higher than either of these. However, the order of the means of the medium versions for the "Snakes" film is the reverse of this. Thus, while some of the individual differences may be "significant" in a sampling sense, the inconsistency of direction of difference prohibits any firm conclusion concerning the relative merits of the methods.

In general, for these films and this population, showing the film twice was about as effective for teaching specific important points, as emphasizing these points directly in the film by means of participation questions or reinforcing statements.

The items which were not specifically emphasized either by questions or statements, were generally learned better when presented two times, than when presented in any of the other experimental versions.

TABLE 3

MEAN SCORES ON PART TESTS FOR BOTH FILMS -

A. Items Emphasized at the Persistent Level

	Wrenches (25 Items)			Snakes (20 Items)		
	Boys	Girls	Both	Boys	Girls	Both
PQ	18.8	12.4	15.6	14.7	13.8	14.2
PS	17.1	13.7	15.4	15.9	14.9	15.4
C1	15.6	11.3	13.4	14.7	12.3	13.5
C2	18.3	13.1	15.7	13.8	12.9	13.4

B. Items Emphasized at the Medium Level

	Wrenches (13 Items)			Snakes (10 Items)		
	Boys	Girls	Both	Boys	Girls	Both
MQ	8.6	5.9	7.3	7.4	7.1	7.2
MS	8.4	5.5	7.0	7.7	7.2	7.5
C1	7.3	5.3	6.3	7.4	5.8	6.6
C2	8.8	6.2	7.5	6.8	6.1	6.5

C. Items Not Emphasized (for Persistent Level Comparison)

	Wrenches (46 Items)			Snakes (54 Items)		
	Boys	Girls	Both	Boys	Girls	Both
PQ	29.0	19.4	24.2	33.4	28.1	30.7
PS	27.5	20.3	23.9	35.7	30.9	33.3
C1	26.2	18.0	22.1	36.0	30.5	34.2
C2	30.0	21.9	26.0	37.0	32.5	34.7

D. Items Not Emphasized (for Medium Level Comparison)

	Wrenches (58 Items)			Snakes (64 Items)		
	Boys	Girls	Both	Boys	Girls	Both
MQ	38.1	25.3	31.7	41.7	37.5	39.6
MS	35.6	22.5	29.0	42.1	35.2	38.7
C1	34.5	24.0	29.2	45.3	37.0	41.1
C2	39.6	28.8	34.2	43.9	39.3	41.6

CONCLUSIONS

The conclusions indicated by the results of this experiment may be summarized as follows:

1. Inconsistent sex differences were found in the relative effectiveness of the various film versions in terms of total amount of material learned, and to a lesser extent, in terms of amount of emphasized and non-emphasized material learned.

2. In general, the results of the retention tests paralleled those of the immediate tests.

3. In terms of total learning scores of the girls on both films, the original film shown two times and the persistent statement version gave similar results and were more effective than the other versions. On the other hand in terms of total learning scores for the boys, with the possible exception of the original film shown two times, no version showed a marked superiority for the two different films.

4. Material was generally learned better when emphasized by either statements or questions than when it was shown once without emphasis. Showing the technical film (Wrenches) twice was nearly as effective as the use of inserted questions or statement versions in teaching the items specifically emphasized by the latter. With the general information film (Snakes) showing the film twice was not as effective in teaching the items which were emphasized by the use of inserted questions or statements in the experimental versions.

5. For both boys and girls, and for both films, items which were not specifically emphasized by either questions or statements were usually learned better when presented two times (in the repetition version), than when presented in any of the other film versions. In some instances, some other versions were about equally good in teaching unemphasized items, but no other version maintained such a uniform superiority as did the original film shown two times.

6. All differences were small, especially on items not specifically emphasized in some manner. Hence the expense of inserting such statements and questions as these in films of this nature would scarcely seem to be justified.

7. This experiment adds further evidence on the effectiveness of mere repetition in increasing film learning, by the simple and inexpensive procedure of showing an instructional film twice.